REMARKS:

The amendment filed on April 12, 2004 introduced two new limitations into both the independent claims pending in the subject patent application (claims 36 and 38). The first limitation is that the foamed sheet, the heat sealable film, and glue, if used, are made of polyester resin. In order to achieve recyclability it is necessary that the polymeric elements of the sheet be of the same chemical nature, in this case a polyester. The second limitation is that the polyester of the foamed sheet must have a crystallinity of less than 15%.

These new limitations were found to be sufficient for overcoming the rejections made in the November 10, 2003 office action and those rejections have been withdrawn.

In rejection 3 of the July 15, 2004 office action, Claims 23-24, 30-33, 36, 38 and 43 were rejected under 35 U.S.C §103 as being obvious over the teachings of Roulin et al (United States Patent 5,508,075) in view of the teachings of Harfmann (United States Patent 5,681,865) and Nankee et al (United States Patent 4,543,364). As explained below, Harfmann cannot be combined with Roulin to render obvious the foam of claim 38, the container of claim 36, or the process of making a folded container of new claim 44. Harfmann teaches

1. that the foam be smooth (without the essential creases in claims 38, 36 and 44)
2. that the container be thermoformed, (not folded as noted in claims 36, 38, and 44)
3. that the polyester in the container be crystalline, for high temperature applications, as opposed to be being substantially amorphous as in claims 38 and 44.

The Examiner is accordingly respectfully requested to reconsider the rejections made under 35 U.S.C. §103(a) both on this basis and also allow the new claim 44 for the same reason.

The July 15, 2004 office action rejected the claims over Roulin when combined with other references. While Roulin discloses a food container, a foamed polyester, a heat sealable polyester, a creased unfoamed polyester, and polyethylene terephthalate, these elements are found in different laminate structures with no motivation within Roulin to combine the elements into a single laminate for a recyclable folded container.

The food container disclosed by Roulin is a folded gable top carton (column 3, lines 33 – 40). The foamed polyester core disclosed by Roulin at column 6, lines 17-24 refers to the laminate structure shown in Figure 8. Figure 8 has a foldable foamed core (column 6, line 17), but Roulin does not indicate or appreciate that in order to be foldable, the polyester core must be creased (column 6, lines 10-39). The creasing of a structure with a foamed polyester

core is not disclosed at all in Roulin.

The July 15, 2004 office action referenced column 7, lines 4-14 as establishing a crease in a structure with a foamed polyester core. This is not a correct interpretation of Roulin. Column 7, lines 4-14 refer to the laminate structure of Figure 9 (column 6, lines 40 to column 7, line 1). Figure 9 is not directed to a gable top carton, but to a flexible bag (column 7, line 1). The difference between a bag's flexibility and a carton's rigid sidewall is detailed in the present specification at page 1 line 27 to page 2 line 10. The polyester core of Figure 9 cannot be a foamed polyester because the structure and each layer of the structure is transparent (column 7, line 13-14). By definition, a transparent layer cannot contain a foamed material because foamed materials are opaque.

The heat sealable polyester resin is also disclosed in Figure 9 (column 6, line 60). Again, the laminate of Figure 9 illustrates the transparent wall of a bag and is accordingly not directed to the wall of a rigid carton made with a foamed polyester.

While Roulin discloses several of the attributes of the claimed foam and container, as noted in the July 15, 2004 office action, Roulin fails to disclose a recyclable container. Not only does Roulin fail to disclose recyclability, Roulin teaches away from it in favor of disposability. The purpose of the food container structures of Roulin is to replace a recyclable material (aluminum) with a disposable container which can be disposed of without harm to the environment (column 1, lines 27 and 49). It is impermissible to combine the elements of a reference when that reference teaches away from combining those elements. It is therefore impermissible to combine the creases of the unfoamed, flexible polyester bag of Figure 9 with the foamed polyester core of Figure 8.

Even if the Roulin combinations are allowed, the secondary references fail to supplement the teachings of Roulin in a manner rendering the claims obvious. The secondary references are either inapplicable or teach away from the claimed limitations. As noted in the July 15, 2004 office action, Roulin fails to disclose a foamed sheet having a density of less than 700 kg/m3 and crystallinity lower than 15%. The July 15, 2004 office action notes that Harfmann teaches the use of a foamed sheet having a density less than 700 kg/m3 (column 8, lines 50-52) and crystallinity lower than 15% (column 8, lines 20-22) in the making of a container for food (column 1, lines 11-13).

One of ordinary skill in the art would not choose the foam of Harfmann for use in Roulin. While Harfmann and Roulin both disclose a food container, the disclosure of a food

container is not sufficient motivation to combine the two references. The food containers are entirely different and for opposing applications. First, Harfmann's foam is smooth and cannot be used in folded containers because it does not have the creases essential for a folded container (column 2, line 9). Second, Harfmann's containers are thermoformed which removes permanent lines (column 6 lines 23,24 and column 5, lines 28-29) and Harfmann teaches away from containers where the polyester remains amorphous (column 8, lines 13-14).

Roulin's food package is limited to a folded gable top carton (column 3, lines 33-40). Harfmann's phrase "food containers" refers to thermo-formed polystyrene food containers such as cups (column 1, lines 11-13 and see column 5, lines 28-29; Example 4 column 11, lines 54-55 for the thermo-forming aspect). Polystyrene is not even mentioned as a possible substrate in Roulin. There is no motivation for one of ordinary skill to use Harfmann's substitute for thermo-formed foamed polystyrene in a folded gable top carton.

There is also no motivation to use Harfmann's polyester foam and its subsequent thermoformed containers in low temperature applications. Harfmann's use of the polyester is for high temperature applications where polystyrene fails. Harfmann notes that the current polystyrene containers are not usable because they warp and distort at temperatures greater than 366.3 °K (93.2 °C) (column 3, lines 16 – 17). One object of Harfmann's use of polyester is to provide a container which will not warp and distort (column 1, lines 19-21). Harfmann uses heptane as opposed to hexane as foaming agent so the container can be used in high temperature FDA applications (column 1, line 49; column 8, lines 40-47). In other words, one of ordinary skill in the art would only use the polyester foam of Harfmann and its subsequent containers for high temperature applications where polystyrene fails.

Harfmann's use of polyester foam in high temperature applications requires that the polyester foam be crystalline in the container. It is well known in the art that an amorphous polyester container (crystallinity less than 15%) will warp and distort at temperatures above polyester's glass transition temperature of 343 °K (70 °C) (column 8, line 2) (See United States Patent 5,000,991 to Hayashi, previously cited by the examiner, at column 10, lines 62-65, teaching that heating applications require a foam crystallinity higher than 15%). Harfmann teaches crystallizing the container at column 8, lines 12-14. Harfmann's container must have more than 15% crystallinity to perform in high temperature applications. Therefore Harfmann does not disclose a container with a polyester of less than 15%

crystallinity, nor a container as specified in claim 36 or the process of claim 44.

Additionally, Harfmann's containers are not folded as Roulin's, but are formed by thermo-forming (column 5, lines 28-29; Example 4 column 11, lines 54-55). In thermo-forming, the foam is heated above the polymer's glass transition temperature and then drawn into a molded shape. Harfmann teaches that thermoforming smoothes and removes undesirable permanent lines made during foaming (column 6, lines 24 and column 5, lines 27-28, column 9 lines 24-25). In fact, a sheet without lines and "smooth to the touch" is an object of Harfmann (column 2, lines 8-9 and column 4, line 9). By contrast, permanent lines are intentionally placed in the laminate of Roulin in order to fold the container (column 3, lines 48 – 49). The permanent creases in the foam is an essential limitation of independent claims 36, 38, and 44 and is in direct contrast to being "smooth to the touch" as taught by Harfmann.

Harfmann defines "good quality foam" as a "substantially uniform closed cell foam with a surface that is substantially smooth to the touch" (column 4, lines 7-9). Neither the element of substantially uniform closed cells nor a surface that is substantially smooth to the touch is sufficient motivation to use Harfmann's foam over the many other polyester foams. In fact, Harfmann's definition of "good quality foam" is mutually exclusive with the foam required to make a folded container.

First, the uniform closed cell does not indicate the crystallinity or density level essential for the foam to be creased and folded. A foam could easily have uniform cell structure and crystallinity greater 15%. Hayashi, for example, notes good quality foams of uniform cell structure with crystallinity greater than 15% (column 8, lines 57-68). Therefore, having a good quality as expressed by uniform closed cell provides no motivation to select one foam over another, in particular the non-crystalline foam over the crystalline foam.

See next page

Second, "substantially smooth to the touch" is contrary and mutually exclusive with being creased and being folded. Being smooth to the touch teaches away from and is directly opposite to having creases. A foam cannot be both creased and smooth to the touch at the same time. Therefore foam that is "smooth to the touch" cannot be used to create a folded gable top carton.

For the reasons listed above Harfmann cannot be combined with Roulin. [1]

The motivation cited in the July 15, 2004 office action to use Nankee is to create a clear container. Nankee identifies label glues as causing colored (non-clear) recycled polyester after the recycling process, neot before (column 1, lines 15 – 19). Even if Nankee was concerned with a clear container, Nankee is not applicable because by definition a foamed container is not clear thus making Nankee inapplicable. Nankee is concerned with creating a clear polyester after the container is recycled and teaches the use of hydrocarbon solvents to remove the glues during the recycling process (column 1, lines 41-45). Nowhere does Nankee provide any motivation to replace the non-polyester glues with polyester glues found in the claims. There exists no motivation to combine Nankee with Roulin.

It is specifically noted that claim 36 is an independent article claim to a recyclable polyester container with the polyester present as foam with a density less than 700 Kg/m3 and crystallinity less than 15%, and wherein the container is obtained by folding the foam along lines of a pattern creased on the foam. The prior art does not disclose nor suggest the article of claim 36. As an article, the motivation to combine references must be based upon the container.

Harfmann's container does not disclose the elements essential to the invention.

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1 The teachings of Harfmann cannot be combined with the teachings of Roulin in a manner that renders the composition or article now being claimed obvious. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting that combination. ACS Hospital Systems, Inc. v. The Montefiore Hospital, 732 F.2d 1572, 221 USPQ 929 (Fed. Cir. 1984). Thus, the teachings of Harfmann cannot be combined with the teachings of Roulin in the present case since none of these references suggest such a combination. Absent the discovery of the present invention, persons having ordinary skill in the art would have no logical basis for combining the teachings of Harfmann with the teachings of Roulin. There is no teaching in Harfmann that would motivate a person having ordinary skill in the art to combine the Harfmann's sheet for thermoformed crystalline containers without creases for the folded non-crystalline containers of Roulin.

At the time the subject invention was made, persons having ordinary skill in the art would not have piecemealed together the teachings of the references being cited in the manner suggested by the Examiner. Obviousness is not determined by the application of hindsight, or retrospect, with the knowledge of the patentee's discovery. Rather, it is determined as of the time of the invention, based solely on the knowledge disclosed by the prior art as a whole. Republic Industries, Inc. v. Schlage Lock Co., 592 F.2d 963, 200 USPQ 769 (1979); Schnell v. Allbright-Nell Co., 348 F.2d 444, 146 USPQ 322 (1965).

Harfmann's container is thermoformed, is not folded (column 5, line 28), is uncreased (column 5, line 28) and is crystallized (>15%) (column 8, lines 13-14) for high temperature applications (column 1, line 50). Harfmann's container does not have creases as it is made from foam that is either "smooth to the touch" (column 4, line 9) or whose lines are removed during the forming process (column 5, line 28; column 9, lines 23-24). The container of Harfmann (a thermoformed, uncreased, crystalline container) therefore cannot be combined with Roulin to disclose a folded container with a creased foamed polyester where the polyester is a foam with density less than 700 kg/m3 and crystallinity less than 15% as specified in claim 36.

Rejections 4 and 5 are directed towards dependent claims and rely upon Roulin in view of Harfmann and Nankee in further view of Hubbard et al (WO 97/47694) or the Encyclopedia of Polymer Science and Engineering, respectively. By virtue of the fact that rejections 4 and 5 both rely upon Roulin in view of Harfmann and Nankee, rejections 4 and 5 are addressed in the arguments regarding Roulin, Harfmann and Nankee. Accordingly, the rejected dependent claims are also allowable since the combinatorial use of Roulin, Harfmann, and Nankee is not permissible.

The commissioner is hereby authorized to deduct 126 dollars from deposit account number 50-3078 and credit any overpayments for the 7 dependent claims in excess of 20 added by this amendment.

For the reasons delineated herein, the claims pending in the subject patent application are not obvious over the teachings of the cited references. It is now accordingly appropriate to allow the subject patent application and such an allowance is respectfully requested.

Respectfully submitted,

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